CAN DIEN TU TAN HIEP THANH

FM Mini-indicator



User Manual

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BEFORE USING THE INDICATOR

Thanks for purchasing ***EXCELL FM Mini-indicator***. In order to operate smoothly, to last the durability, and to reduce the chance of breakdown for this product, please read the following instructions carefully.

Safety Precaution

- & Turn off power before installing or disassembling.
- & Keep the product away from sunshine. The temperature range for operation is -10℃ ~ +40℃.
- & To connect the ground is a must for this equipment. The ground impedance is less than 100Ω.
- & Never connect the ground with other equipments which are huge in power consumption.
- & No ground or incorrect ground connecting might cause the electric shocks or breakdowns.

<Chapter 1> Features and Specification

1-1 Features

- Large and clear LCD (height 25.4mm × 10mm)
- LED Backlight, more duration, more energy saving
- Auto zero tracking
- Weighing calibration in both kilogram and pound
- High resolution switch function to display 10 times divisions
- Weighing unit shift function & data accumulation function
- Adjustable digital filter
- Available in connecting with up to four 350-ohm load cells
- Capable of connecting with 6-wire load cells
- Convenient to operate power switch in front panel

1-2 Specification

Analog Specification

- Load Cell Current: DC 5V ±5% 60mA (Up to Four 350Ω Load Cells)
- Max. Load Cell Input Voltage: 16 mV
- Input Sensitivity: 0.12μV/D or more
- Conversion Rate: Approximately 100 times/sec. (max.)
- Resolution: 19 bits

Digital Specification

- Display: LCD, 6 digits, height 25.4x10mm, LED backlight
- Display Frequency: 50 times/sec. (max.)
- Display Range: - 999999 ~ 999999
- Min. Division: 1, 2, 5, 10, 20, 50
- Decimal Point: 0, 0.0, 0.00, 0.000, 0.0000
- Memory: Calibration parameter and function setting are all stored in EEPROM.

Optional Interface

- OP-01 RS-232 / RS-485 (Includes RTC Function)

Power Requirement

- Adaptor Spec.: Input 120/230VAC 50~60Hz, output 9V/1000mA
- 6V/5pcs Hi-MH rechargeable battery kit (1800mA/1hr)
- Max. Power Consumption (by rechargeable battery):
  120mA (with 4 Load Cells + backlight + RS-232 interface) →15 hours
  50mA (with 1 Load Cell + no backlight + no RS-232 interface) →36 hours

Others

- Operation Temperature: -10℃ ~ 40℃
- Operation Humidity: < 85% R.H.
- Dimension: W 49.5 × L193 × H134 (mm)
- Weight: 700 (g)

<Chapter 2> Keypad Operation Instruction

Function	Operation	Description
General Function Setting	Press and hold [ENTER], and then press [F1]	Refer to **<Chapter 8> Function Parameter Setting** for details
Weighing Parameter Setting	Adjust calibration switch to ON	Setting for decimal point, capacity, division, zero tracking, and unstable detecting, etc. Refer to **5-1** Specification Setting for details.
Calibration	Adjust calibration switch to ON	Refer to **5-2** Internal Weight Calibration for operation.
Self-diagnosis Mode	While turning on with countdown, press and hold [ZERO +].	Refer to **9-3** Self-diagnosis Mode for details.
Default Recover for All Parameters	Adjust calibration switch to ON, and then press and hold [F1] [ENTER].	Refer to **9-1** for details.
Default Recovery for General Function Parameters	While turning on with countdown, press and hold [F1] [ENTER].	Refer to **9-2** for details.

4 During the operation, use the following keys to complete all the works.

[ZERO +] ⇒ To add the value flashing

[F2 4] ⇒ To move the cursor rightward

[TARE −] ⇒ To reduce the value flashing

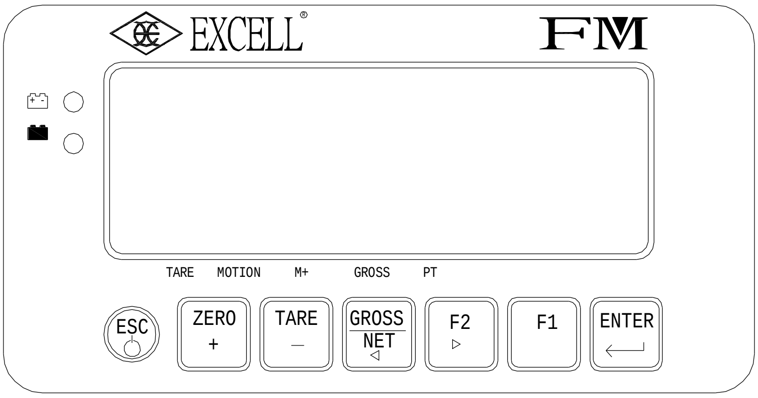
[ENTER] ⇒ Storage setting

[GROSS/NET 3] ⇒ To move the cursor leftward

[ESC] ⇒ To abort setting/to escape

<Chapter 3>   Front & Rear Panels

3-1 Front Panel



Indication:

(battery +−)	:	Battery charged status
(battery)	:	Battery charging status
TARE	:	Tare status
MOTION	:	Unstable weighing indication
M+	:	Accumulation status indication
GROSS	:	Gross weight
PT	:	Pre-tare

Keypad:

ESC (power)
1) Power ON / OFF. Press and hold this key for 3 seconds to shut down.
2) To abort or escape when setting.

ZERO +
1) Weight re-zero.
2) To add the value when setting.

TARE −
1) To eliminate the gross weight.
2) To reduce the value when setting.

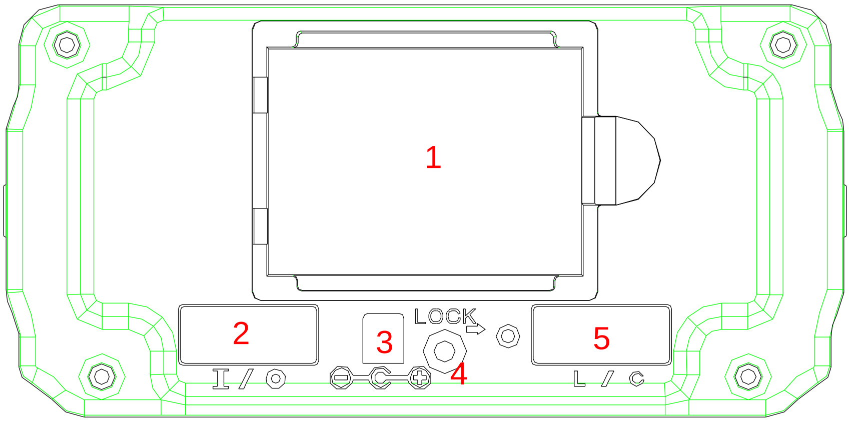
GROSS / NET 3
1) To switch Gross / Net weight shown on display.
2) To move the cursor leftward when setting.

F2 4
1) Keypad function (FNC-02 & FNC-03)
2) To move the cursor rightward when setting.

F1
Keypad function (FNC-02 & FNC-03)

ENTER
Confirmation key.

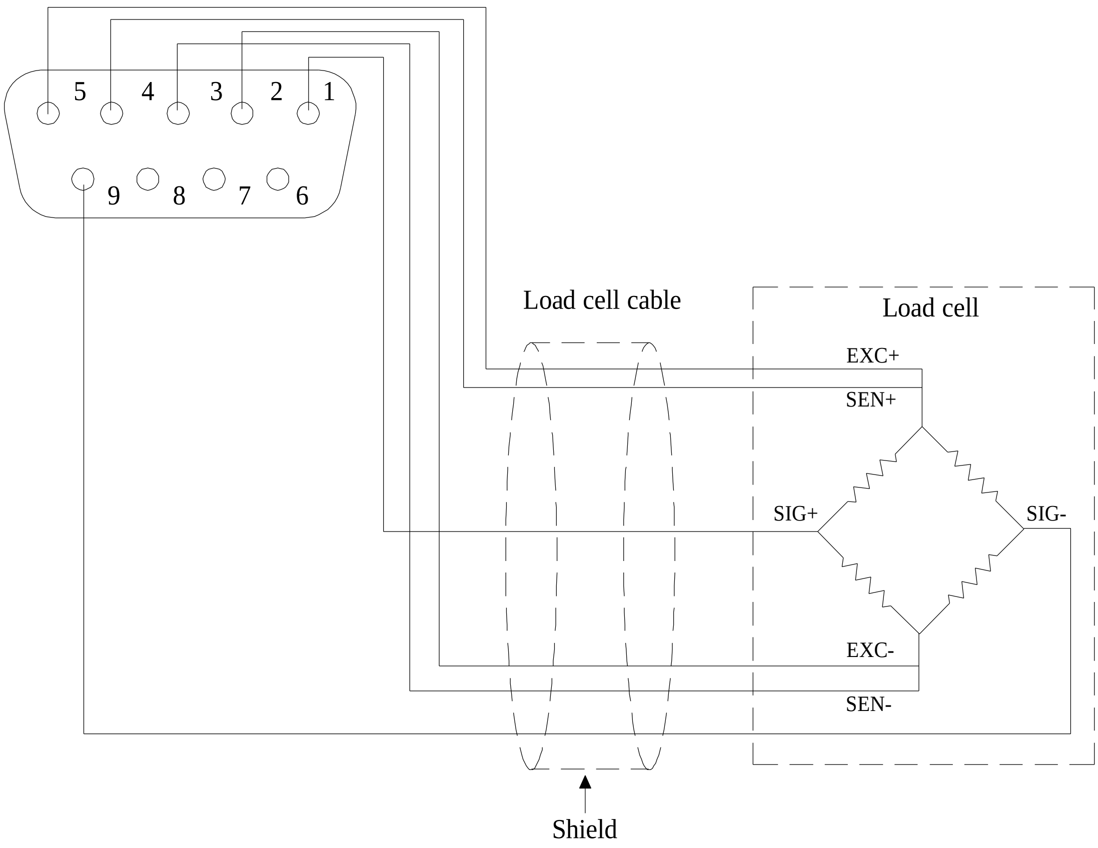
3-2 Rear Panel



1. Battery Case
2. RS232/485 Input/Output
3. DC 9V Power Input
4. Calibration Switch
5. Load Cell Connect Socket

<Chapter 4> Installation

4-1 Load Cell



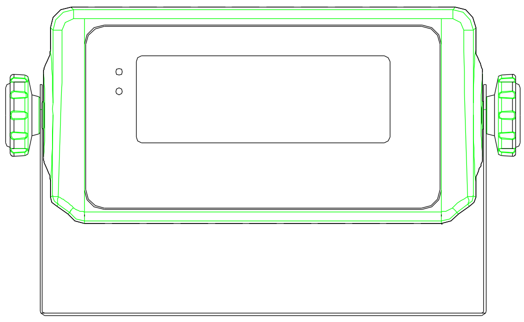
4-wired (5-wired) Load Cell

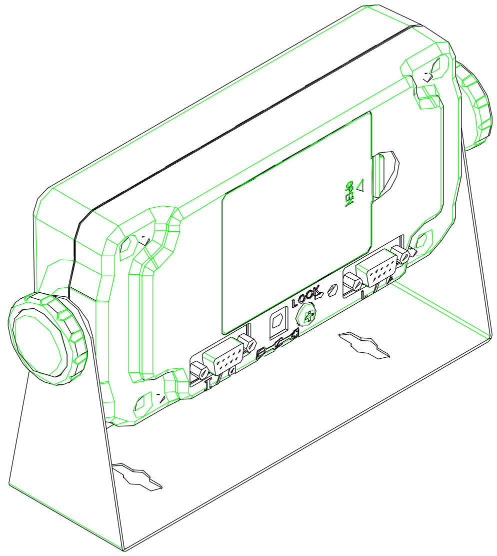
Short Pin4&5 to connect with EXC+
Short Pin2&3 to connect with EXC-
Pin1 connects with SIG+
Pin9 connects with SIG-
Pin6, 7, 8 connect with Shield

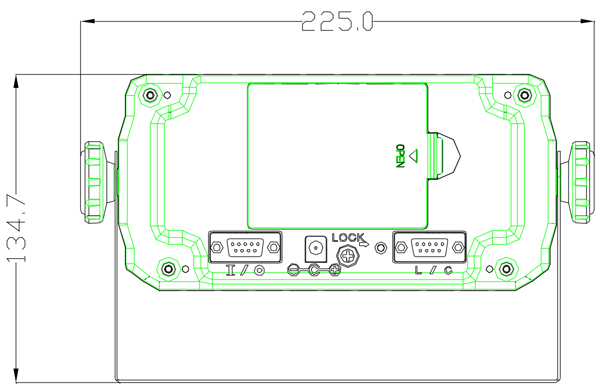
6-wired (7-wired) Load Cell

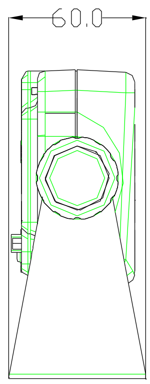
Pin5 connects with EXC+
Pin4 connects with SEN+
Pin3 connects with EXC-
Pin2 connects with SEN-
Pin1 connects with SIG+
Pin9 connects with SIG-
Pin6, 7, 8 connect with Shield

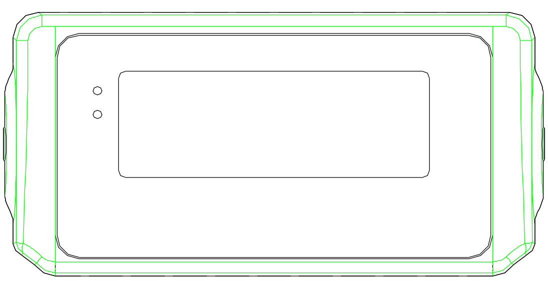
4-2 Dimension

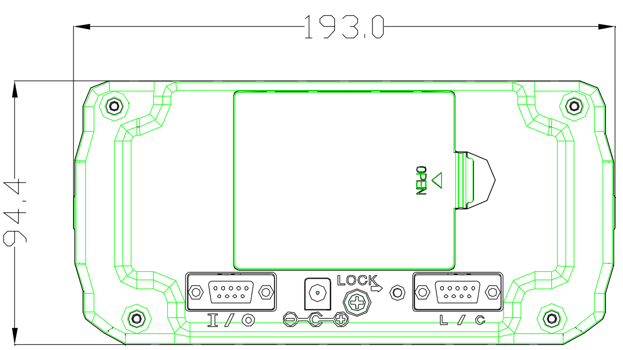


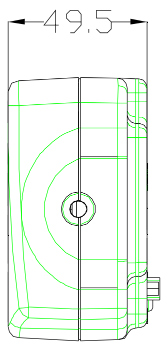




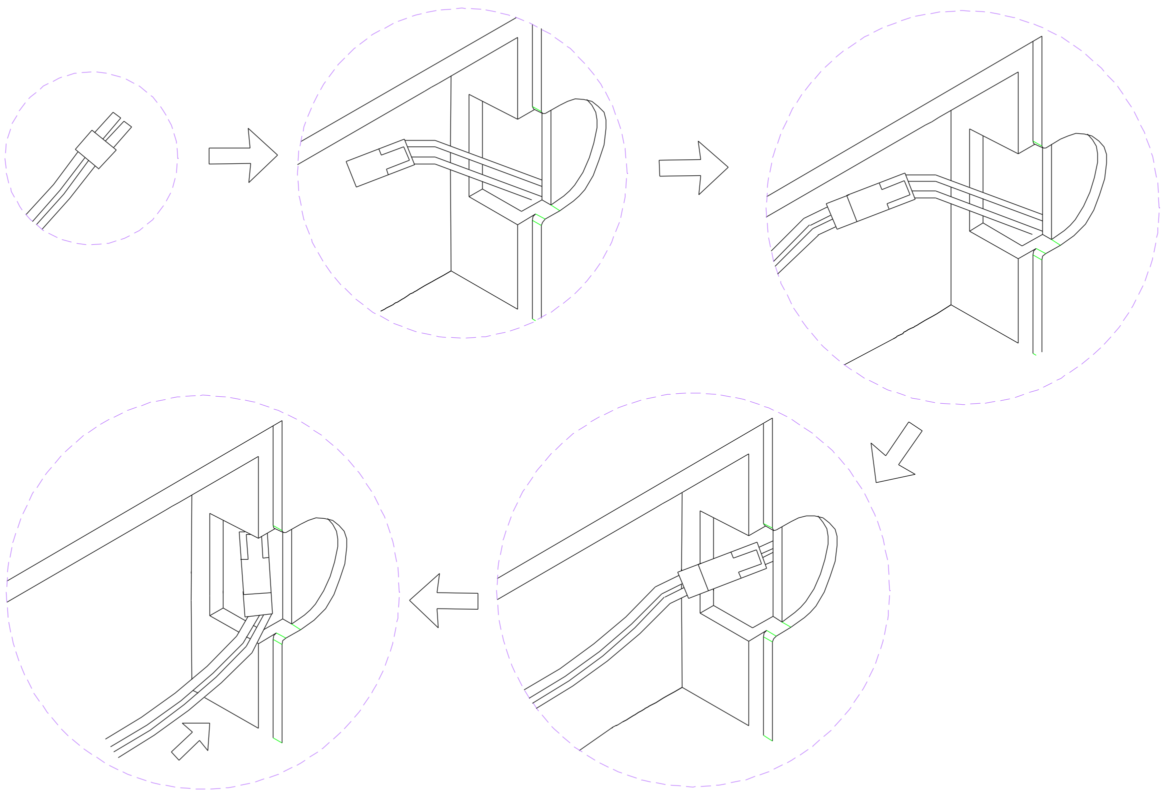




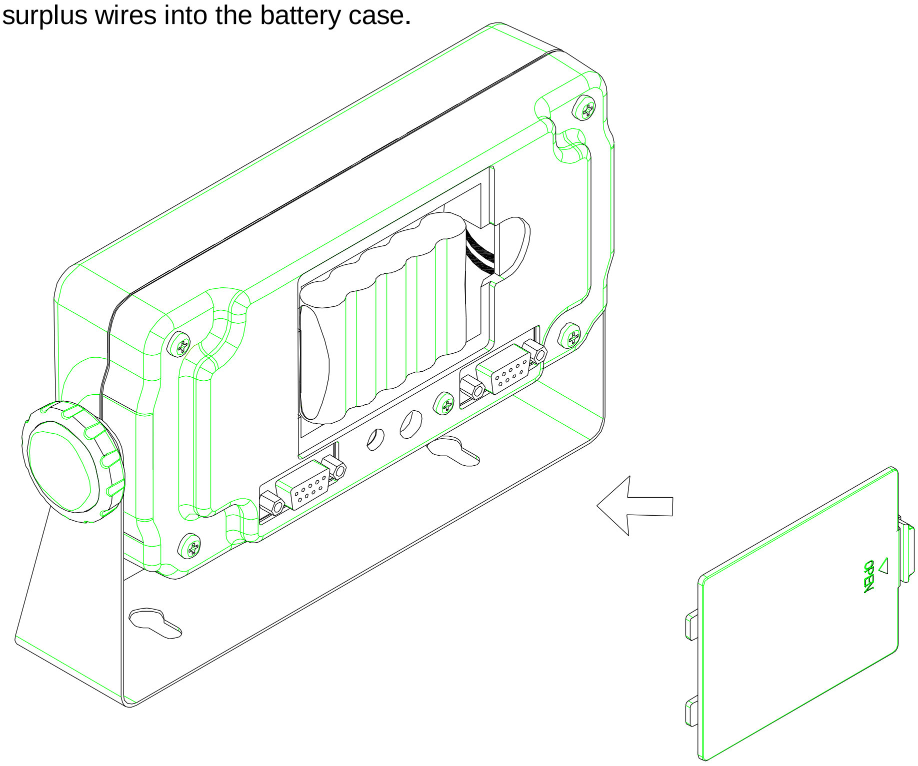




4-3 Battery Assembly

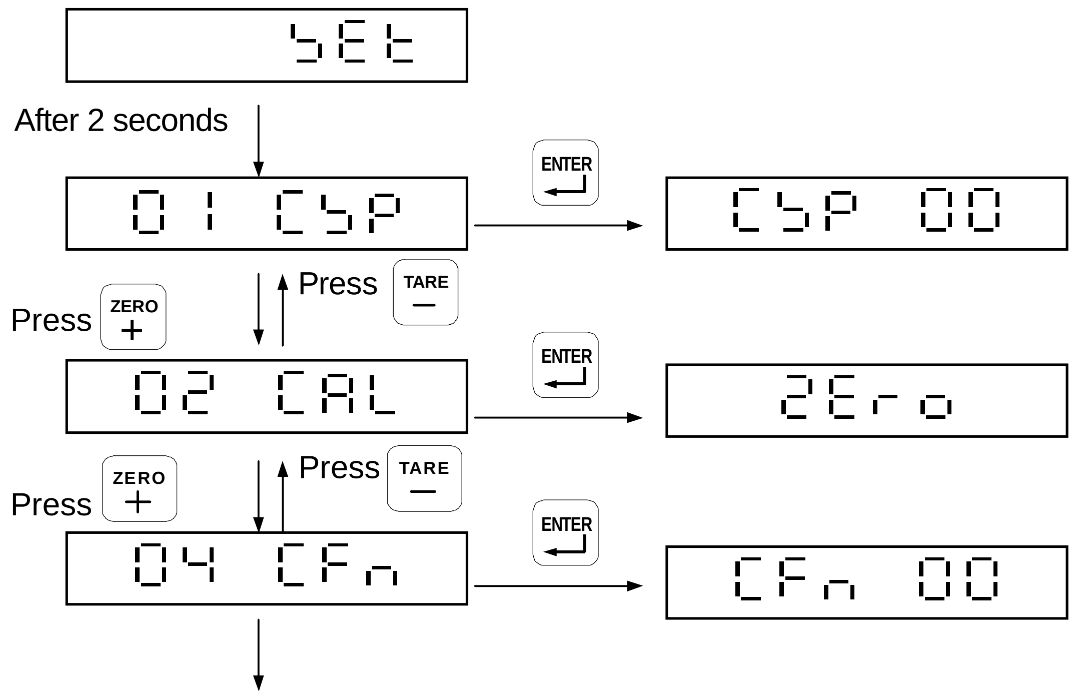


Stuff the surplus wires into the battery case.



<Chapter 5> Internal Calibration

Adjust calibration switch to “ON”, and the screen displays:



Adjust calibration switch back to “OFF”.

01 CSP ⇒ Specification Setting

02 CAL ⇒ Internal Weight Calibration

04 CFn ⇒ Internal Function Setting

5-1 Specification Setting 01 CSP

01 CSP

Press ENTER

CSP-00

Input the ***Parameter Code** intended

CSP-04

Press ENTER

000000

The screen displays the parameters set previously.
Input the parameters intended and then press ENTER.

CSP-05

Continue other functions setting or press ESC to escape.

***Parameter Code**

- CSP-00 ⇒ Decimal Point
- CSP-01 ⇒ Capacity
- CSP-02 ⇒ Division 1
- CSP-03 ⇒ Division 2
- CSP-04 ⇒ Zero Tracking Setting
- CSP-05 ⇒ Unstable Detecting Setting

- ZERO + ⇒ To add the value flashing
- TARE − ⇒ To reduce the value flashing
- GROSS/NET 3 ⇒ To move the cursor leftward
- F2 4 ⇒ To move the cursor rightward
- ENTER ⇒ Storage setting
- ESC ⇒ To abort setting / escape

2 Specification Parameter Description

Parameter Code	Function	Setting		Default Setting
		Parameter	Description	
CSP-00	Decimal Point		Refer to the description on next page.	
CSP-01	Capacity	999999 ↓ 000000	Max. value for weight display	999999
CSP-02	Division 1	1 2 5 10 20 50	Min. value for weight display	1
CSP-03	Division 2	1 2 5 10 20 50	Min. value for Weight display	1
CSP-04	Zero Tracking Setting		Refer to the description on next page.	
CSP-05	Unstable Detecting Setting		Refer to the description on next page.	

2 Parameter Display Description

CSP-00 Decimal Point

Display	Decimal Point Digit
d 0	None
d 0.0	1 Digit
d 0.00	2 Digits
d 0.000	3 Digits
d 0.0000	4 Digits

CSP-04 Zero Tracking Setting

Display	Division/Period
0.25 d	0.25 D/1 sec
0.5 d	0.5 D/1 sec
0.75 d	0.75 D/1 sec
1 d	1D/1 sec
1.25 d	1.25 D/2 sec
1.5 d	1.5 D/2 sec
1.75 d	1.75 D/2 sec
2 d	2 D/2 sec
no	No Zero Tracking

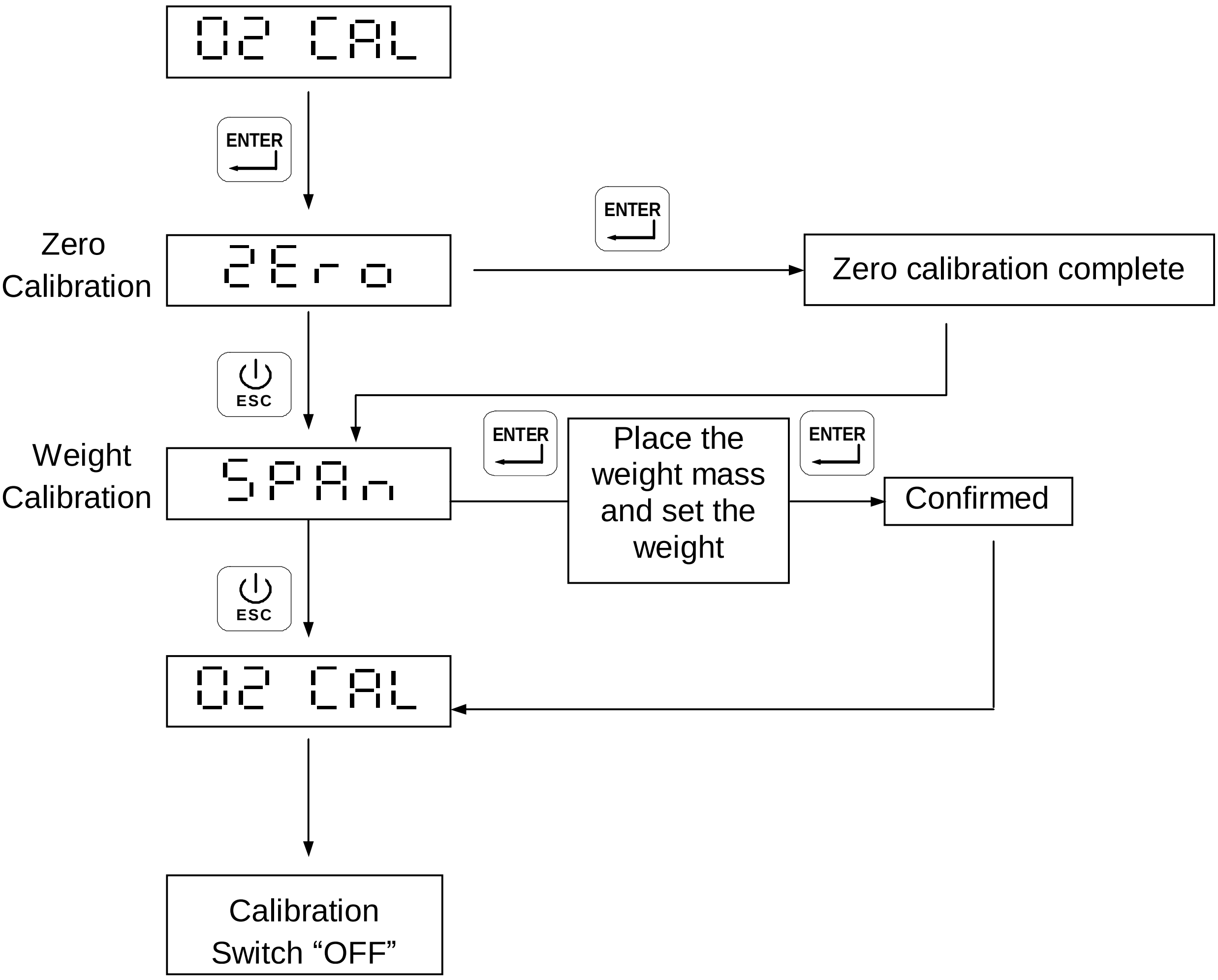
CSP-05 Unstable Detecting Setting

Display	Division / Period
0.25 d	0.25 D/1 sec
0.5 d	0.5 D/1 sec
0.75 d	0.75 D/1 sec
1 d	1D/1 sec
1.25 d	1.25 D/2 sec
1.5 d	1.5 D/2 sec
1.75 d	1.75 D/2 sec
2 d	2 D/2 sec
no	No Unstable Detecting

5-2 Internal Weight Calibration 02 CAL

Turn on and warm up the machine for 15 to 30 minutes before calibration.
Adjust calibration switch to "ON", and the screen will display SET.
Press TARE – or ZERO + to select 02 CAL.

Procedure



Zero Calibration

a) Ensure nothing on the platter; after being stable, press ENTER, and the screen will display " **.......** ". The zero calibration will be complete 5 seconds later.

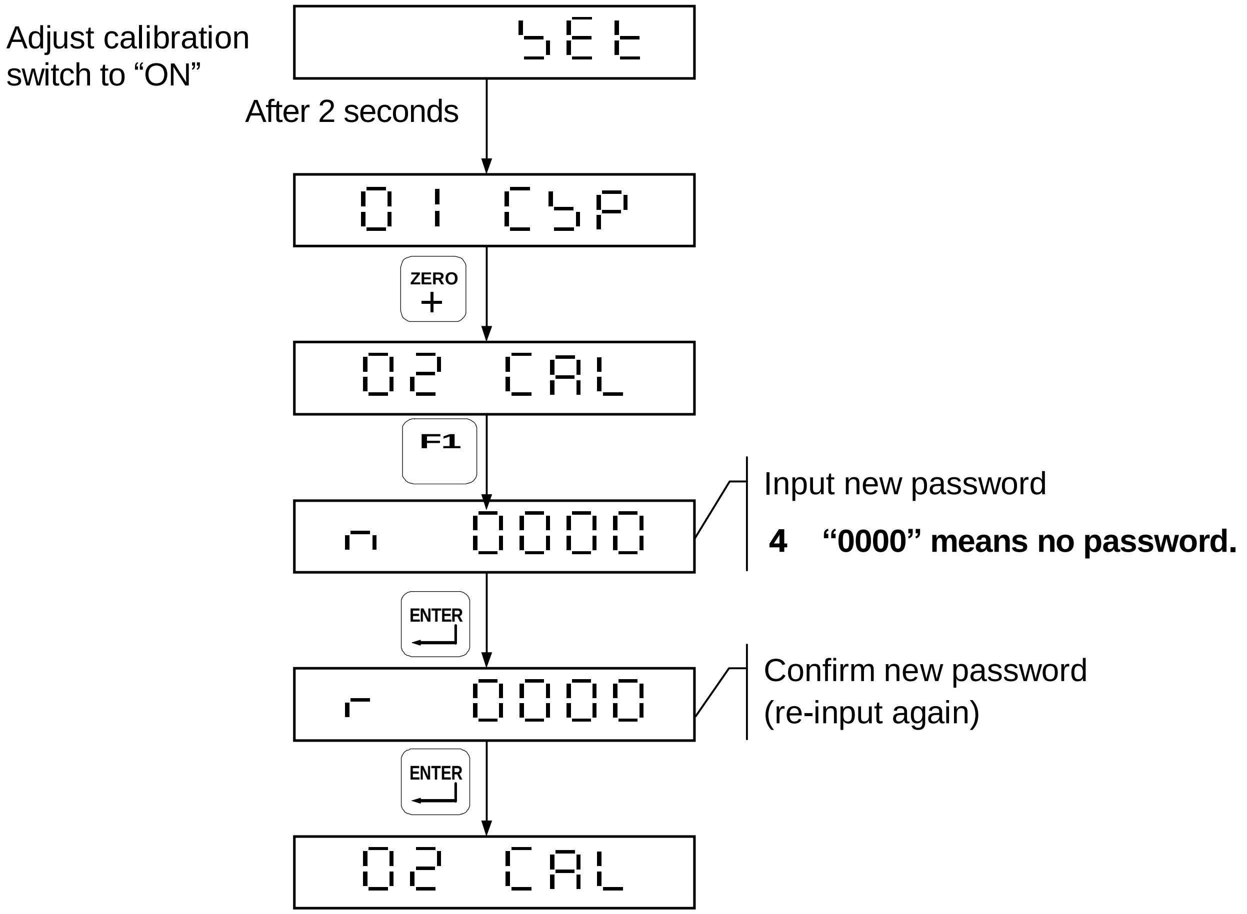
b) To abort zero calibration, just press ESC .

Weight Calibration

a) Place an object, whose weight is known, on the platter, and input the weight value from front panel. After being stable, press ENTER and the screen will display "**.......** ". The weight calibration will be complete 5 seconds later.

b) To abort weight calibration, just press ESC .

2 Password Setting



4 After complete password setting, when entering calibration mode or function setting mode, the screen displays Pu for 1 second, and then 0000. It’s necessary to input the correct password to continue each setting.

If the password inputted is not correct, the screen displays Err.

5-3 Internal Function Setting 04 CFn

04 CFn

Press ENTER

CFn-00

Input the ***Parameter code** intended

CFn-05

Press ENTER

000000

The screen displays the parameters set previously. Input the parameters intended and then press ENTER

CFn-06

Continue other functions setting or press ESC to escape.

***Parameter Code**

CFn-00 ⇒ Tare or Zero Function under Unstable Status

CFn-01 ⇒ Turning on Re-zero

CFn-02 ⇒ Re-zero Range

CFn-03 ⇒ Filter Strength

CFn-04 ⇒ AD Sampling Rate

CFn-05 ⇒ Animal Scale Mode

CFn-06 ⇒ Animal Scale Stable Range

CFn-07 ⇒ Animal Scale Sampling Frequency

CFn-08 ⇒ Dual Range Resolution Setting

CFn-09 ⇒ Dual Range Resolution Middle Point Setting

ZERO + ⇒ To add the value flashing

TARE − ⇒ To reduce the value flashing

GROSS/NET 3 ⇒ To move the cursor leftward

F2 4 ⇒ To move the cursor rightward

ENTER ⇒ Storage setting

ESC ⇒ To abort setting / escape

2 Internal Function Parameter Description

Parameter Code	Function	Setting Parameter	Setting Description	Default Setting
CFN-00	Tare or Zero Function under Unstable Status	0	ON	0
		1	OFF	
CFN-01	Re-zeroing after Turning on	0	OFF	0
		1	ON	
CFN-02	Re-zero Range	0% ~ 30%	0%: Full range re-zero 1% ~ 30%: Capacity × ± setting value%	0
CFN-03	Filter Strength	0 ~ 5	Strength increases by number	2
CFN-04	AD Sampling Rate	0	No limit	2
		1	20 times/sec.	
		2	10 times/sec.	
		3	5 times/sec.	
CFN-05	Animal Scale Mode	0	OFF	0
		1	Mode 1: No weight display under unstable status	
		2	Mode 2: Weight display whether under stable or unstable status	
CFN-06	Animal Scale Stable Range	0 ~ 100	Mode 2: Stable Range Setting	30
CFN-07	Animal Scale Sampling Frequency	0	8 times	2
		1	16 times	
		2	32 times	
		3	64 times	
		4	128 times	
CFN-08	Dual Range Resolution Setting	0	Multi-interval	0
		1	Multi-range	
CFN-09	Dual Range Resolution Middle Point Setting	0 ~ 65535		5000

2 Error Message

(1) Err 0 — Load Cell or A/D circuit extraordinary

(2) Err 2 — Real weighing value ≦ zero value

(3) Err 6 — Internal resolution ＜ 0.12μV/D range

(4) Err. — Incorrect password

(5) E 1 — Turning on zero ≦ zero range

(6) E2 — Turning on zero ≧ zero range

<Chapter 6>   Special Function

6-1   Animal Scale Function Setting

2 **CFN-05 = 1**
(Animal Scale Mode1: No weight display under unstable status)

When no any object is on the platter, the screen will display:

- - - - - - -

When the object is on the platter, after weight has been measured, the screen will display:

20.00

If the display weight value keeps being lower than zero plus 10d, the screen will display:

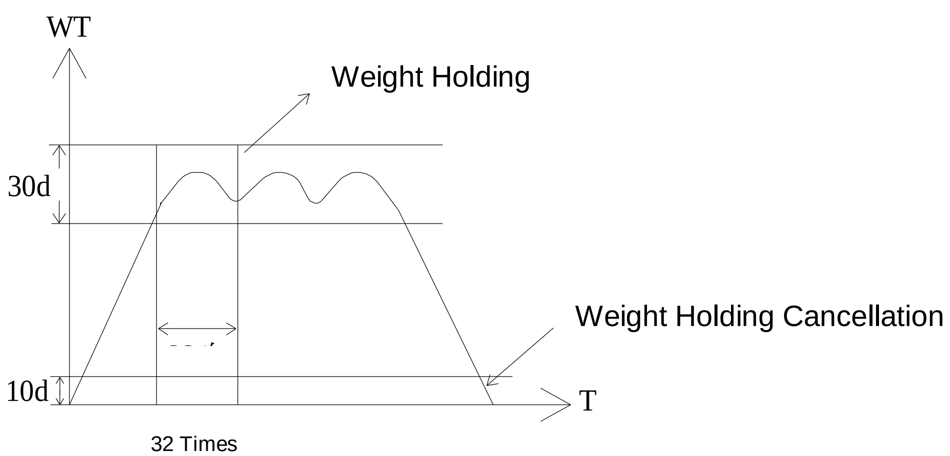
- - - - - - -

2 **CFN-05 = 2**
(Animal Scale Mode 2: Weight display weather under unstable or stable status)

When the weight value reaches the range of CFN-06 and CFN-07 setting, the screen will keep displaying the weight value.

When the weight value is over the range of CFN-06 and CFN-07 setting, the screen will display the normal weight measurement.

Example: CFN-06=30   CFN-07=2

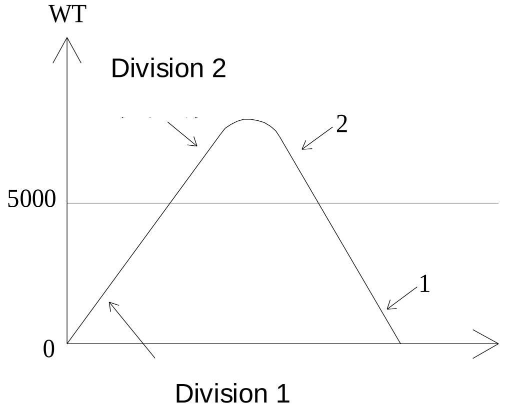


6-2 Dual Range Resolution Switch Function

If the setting of CSP-02 is not the same as CSP-03, the dual range resolution will be activated.

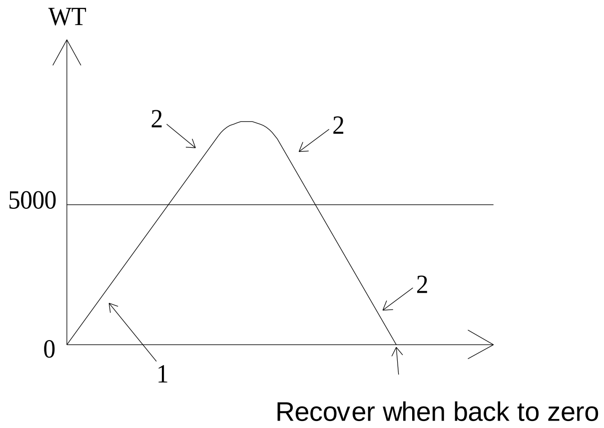
2 **CFN-08 = 0 ⇒ Multi-interval**

If CFN-09 = 5000



2 **CFN-08 = 1 ⇒ Multi-range**

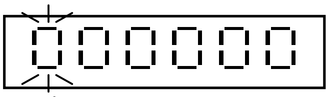
If CFN-09 = 5000



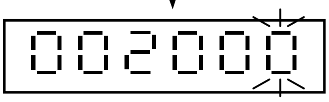
6-3 Pre-tare Function

2 FNC-02 or FNC-03 setting is at parameter 6. (Pre-tare Function)

Under weight display status, press F1 or F2 4 key (according to FNC setting), the screen will display:



Input the pre-tare value intended



Press ENTER key

Back to weight display status (PT indication lights up)

Pre-tare Cancellation

When the gross weight is displayed as "0", press TARE — key to cancel the pre-tare value.

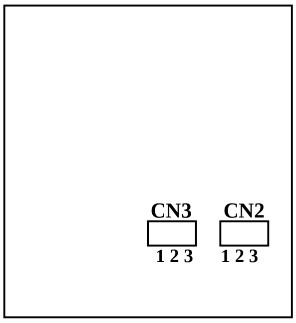
6-4 Resolution Switch Function

2 FNC-02 or FNC-03 setting is at parameter 5. (HR)

Under weight display status, press F1 or F2 4 key (according to FNC setting), the screen will display 10 times resolution, and then, recovery back to original after 5 seconds.

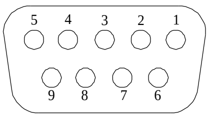
<Chapter 7> Transmission Interface

7-1 OP-01 RS232/RS485 Serial Output (with RTC)



To short 1 and 2 pins is RS485 output.
To short 2 and 3 pins is RS232 output.

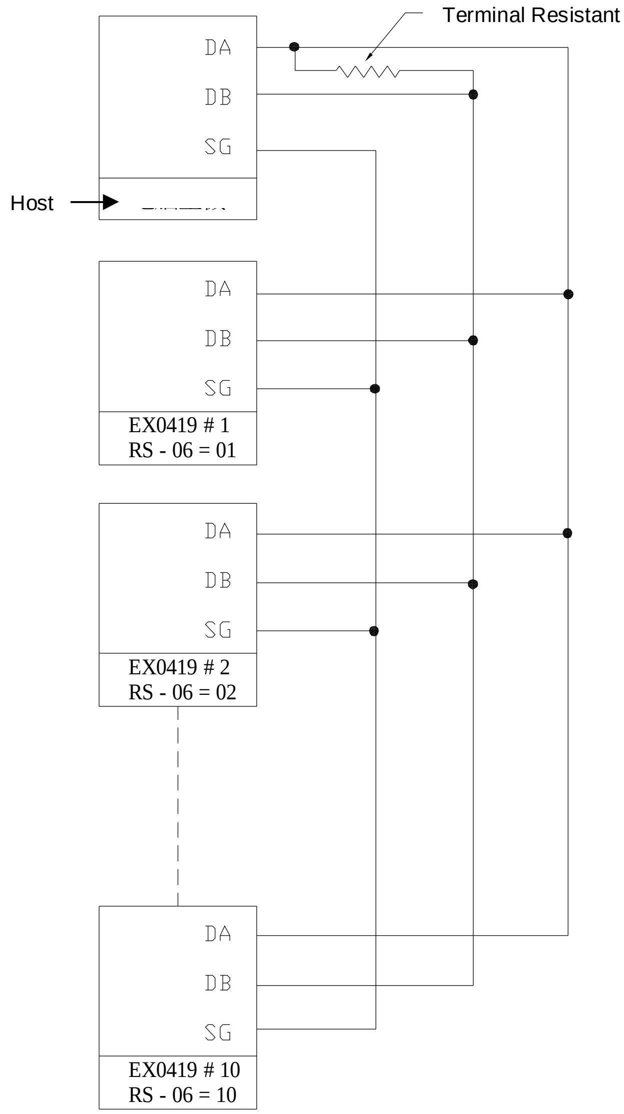
2 **Pin Allocation of Rear Panel**



Pin	Function
2	RXD
3	TXD
5	SG
6	DA
7	DB

4 RS485 interface is capable to connect up to 10 mini-indicators.

2 Connection Description (RS485)

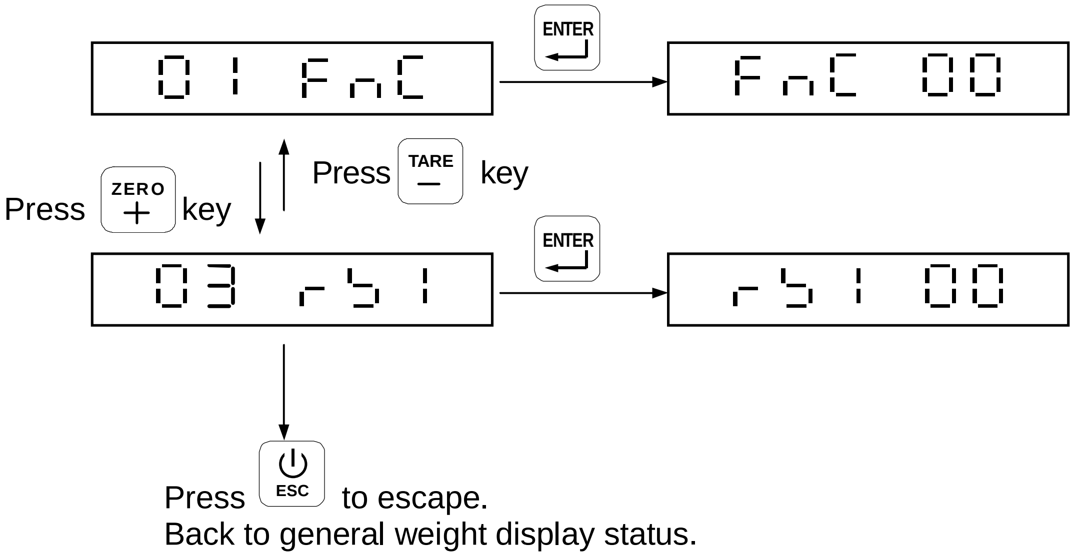


4 Notice

- If the terminal resistant is built-in the host interface, it’s not necessary to connect with another one outside.
- If the host computer is no signal ground (SG), it’s not necessary to connect with it.

<Chapter 8> Function Parameter Setting

Under general weight display status, press [F1] [ENTER], and the screen will display:



01 FnC ⇒ External function setting

03 rS1 ⇒ RS232/RS485 interface function

8-1 Function Setting 01 FnC

01 FnC

Press ENTER

FnC-00

Input the ***parameter code** intended

FnC-01

Press ENTER

000000

The screen displays the parameters set previously.
Input the parameters intended and then press ENTER .

FnC-02

Continue other function settings
or press ESC to escape

***Parameter Code**

FnC-00 ⇒ Key Disable

FnC-01 ⇒ DSP Update

FnC-02 ⇒ F1 Key Function Setting

FnC-03 ⇒ F2 Key Function Setting

FnC-04 ⇒ Backlight Setting

ZERO + ⇒ To add the value flashing

TARE − ⇒ To reduce the value flashing

GROSS/NET 3 ⇒ To move the cursor leftward

F2 4 ⇒ To move the cursor rightward

ENTER ⇒ Storage setting

ESC ⇒ To abort setting or escape

2 Function Parameter Setting

Parameter Code	Function	Setting: Parameter	Setting: Description	Default Setting
FNC-00	Key Disable	0000 ↓ 1111	0 ON 1 OFF 0000 is corresponding to: ZERO + / TARE − / GROSS NET 3 / F2 4 (from left to right)	0000
FNC-01	DSP Update	0	No Limit	1
		1	20 times/sec.	
		2	10 times/sec.	
		3	5 times/sec.	
		4	1 times/sec.	
FNC-02	F1 Key Function Setting	0	Print (printing)	0
		1	Units (units switch)	
		2	M+ (accumulation and printing)	
		3	MC (memory clearing)	
		4	Weight/Weight Accumulation/Times Accumulation Display Switch	
		5	HR (high resolution switch)	
		6	Pre-tare (pre-tare function)	
FNC-03	F2 Key Function Setting	0	Print (printing)	1
		1	Units (units switch)	
		2	M+ (accumulation and printing)	
		3	MC (memory clearing)	
		4	Weight/Weight Accumulation/Times Accumulation Display Switch	
		5	HR (high resolution switch)	
		6	Pre-tare (pre-tare function)	
FNC-04	Backlight Setting	0	Auto Backlight On (backlight on in operation only)	0
		1	Backlight On (backlight always on)	
		2	Backlight Off	

8-2 RS232 Setting 03 rS1

03 rS1

Press [ENTER]

rS1-00

Input the ***Parameter code** intended

rS1-01

Press [ENTER]

000000

The screen displays the parameters set previously. Input the parameters intended and then press [ENTER]

rS1-02

Continue other functions setting or press [ESC] to escape.

***Parameter Code**

- rS1-00 ⇒ Information Pattern
- rS1-01 ⇒ Transmission Method
- rS1-02 ⇒ Transmission Rate
- rS1-03 ⇒ Parity, Bit Length, Stop Bit
- rS1-04 ⇒ Unstable or Over Load
- rS1-05 ⇒ Auto Transmission Condition
- rS1-06 ⇒ Command Address
- rS1-07 ⇒ Output Format
- rS1-08 ⇒ Transmission Times
- rS1-09 ⇒ Date Setting
- rS1-10 ⇒ Time Setting

- [ZERO +] ⇒ To add the value flashing
- [TARE −] ⇒ To reduce the value flashing
- [GROSS/NET 3] ⇒ To move the cursor leftward
- [F2 4] ⇒ To move the cursor rightward
- [ENTER] ⇒ Storage setting
- [ESC] ⇒ To abort setting / escape

2 OP-01 RS232 / RS485 Interface Function

Parameter Code	Function	Setting: Parameter	Setting: Description	Default Setting
RS1-00	Information Pattern	0	Display Correspondingly	0
		1	Gross Weight	
		2	Net Weight	
		3	Tare	
		4	Weight Accumulation	
		5	Times Accumulation	
		6	Output with Date & Time	
RS1-01	Transmission Method	0	Continuous Transmission	0
		1	Auto Transmission	
		2	Press F1 or F2 (4) to transmit	
		3	Command Mode (no address)	
		4	Command Mode (with address)	
RS1-02	Transmission Rate	0	1200	1
		1	2400	
		2	4800	
		3	9600	
		4	19200	
RS1-03	Parity Bit Length Stop Bit	0	N, 8, 1 — No Parity 8 Bits Length 1 Stop Bit	2
		1	O, 7, 1 — Odd Parity, 7 Bits Length, 1 Stop Bit	
		2	E, 7, 1 — Even Parity, 7 Bits Length, 1 Stop Bit	
RS1-04	Unstable or Over Load	0	Continuous Output	0
		1	Stop Output	
RS1-05	Auto Transmission Condition	0	Positive (over + 10D)	0
		1	Positive/negative (over + 10D, under - 10D)	
RS1-06	Command Address	00 ↓ 99	Available only if RS1-01 setting is “4”	0
RS1-07	Output Format	0	Standard Format	0
		1	UMC 600	

RS1-08	Transmission Times	0	No Limit	4
		1	1 times/sec.	
		2	2 times/sec	
		3	5 times/sec	
		4	10 times/sec	
		5	20 times/sec	
RS1-09	Date Setting			
RS1-10	Time Setting			

2 Transmission Format

RS1-00 Þ 0 ~ 3

S	T	,	G	S	,	+	1	2	3	4	.	5	6		g	CR	LF

Header 1 (S T) — Header 2 (G S) — Weight Data (8 digits) — Unit — Terminators

Header 1

ST : Stable Weight / US : Unstable Weight / OL : Weight Over Load

Header 2

GS : Gross Weight / NT : Net Weight / TR : Tare

Weight Data (8 digits)

The first digit of weight data represents "+/-" indication for weight value. The other 7 digits, including decimal point, represent the weight value. If the weight is over load (Header 1 : OL), the screen turns into "blank" except "+/-" indication and decimal point.

Unit

Kg, g, t, lb or "blank"

Terminators

CL and LF are data termination code.

RS1-00 = 4

T	N	,	1	2	3	CR	LF

RS1-00 = 5

T	W	,	+	1	2	3	4	.	5	6	k	g	CR	LF

RS1-00 = 6

D	A	T	E		:	2	0	X	X	/	X	X	/	X	X	CR	LF
T	I	M	E		:	X	X	:	X	X	:	X	X	CR	LF		
G	R	O	S	S	:	+	1	2	3	4	.	5	6	k	g	CR	LF
N	E	T			:	+	1	2	3	4	.	5	6	k	g	CR	LF
T	A	R	E		:	+	1	2	3	4	.	5	6	k	g	CR	LF
T	N				:	X	X	X	CR	LF							
T	W				:	+	1	2	3	4	.	5	6	k	g	CR	LF

2 Command Mode

Command	Function	Command	Function
READ, RW	Weight Reading	CT	Tare Clearing
ZERO, MZ	Weight Re-zeroing	RI	Weight Accumulation
TARE, MT	Gross Weight Reducing	Rm	Times Accumulation
NTGS	Gross / Net Switch	Rn	Date
MG	Gross Weight Indicating	Ro	Time
MN	Net Weight Indicating	AT	Weight and Times Accumulation
		DT	Weight and Times Accumulation Clearing

Œ After setting the commands mentioned above, it's necessary to add the termination code "CR(0DH) and LF(0AH)".

• If the command is not correct, it will reply "E" + "Command Unidentified".

Ž If setting command mode with address (RS1-06 = 4), add "@ address" in front of each command.

Example: When RS1-08 = 1, for reading weight value, the whole complete command should be "@01RW(CR)(LF)".

<Chapter 9> Maintenance

9-1 Default Recovery for All Parameters

(1) Adjust the calibration switch to "ON", when re-zeroing after turning on, press [F1] [ENTER] and hold simultaneously.

(2) The screen will display Init.ALL.

(3) If decided, press [ENTER] and hold until displaying End, and then adjust the calibration switch to "OFF".

9-2 Default Recovery for General Function Parameters

(1) When re-zeroing after turning on, press [F1] [ENTER] and hold simultaneously.

(2) The screen will display Init.Fn.

(3) If decided, press [ENTER] and hold until re-turning on.

9-3 Self-diagnosis Mode

(1) When re-zeroing after turning on, press [ZERO +] and hold.

(2) The screen will display UEr, which means entered self-diagnosis mode.

(3) Use [ZERO +] or [TARE −] keys to select item intended to test.

Press [ENTER] key to enter self-diagnosis, and press [ESC] key to escape.

Item	Display	Testing Item
1	UEr	Program Version Number Displaying
2	dSP	7-segment Display Testing
3	KEY	Keypad and Calibration Switch Testing
4	AdC	AD Conversion Value Displaying
5	EEP	EEPROM Testing
6	rtC	RTC Date & Time Testing
7	232	OP-1 RS232 Serial Output Interface Testing

9-3-1 Program Version Number

7-segment display reveals program version number.

9-3-2 7-segment Display Testing

7-segment display reveals "0 ~ 9" and ".".

9-3-3 Keypad & Calibration Switch Testing

Adjust calibration switch to "ON", and press any key, the corresponding bit will be changed from ı → ¦.

9-3-4 AD Conversion Value

7-segment display reveals the internal value of the present weight.

9-3-5 EEPROM Testing

Displaying PASS represents in normal condition.
Displaying FAIL represents in extraordinary condition.

9-3-6 RTC Time & Date Testing

Press ENTER key to enter the testing mode, and the screen will display date XX.XX.XX.
Example: "05.11.03" represents 3rd of November, 2005.

Press ENTER key again to display time XX.XX.XX.
Example: "09.45.50" represents 9 o'clock, 45 minute and 50 seconds.

9-3-7 RS-232 Serial Output Interface Testing (OP-01)

(1) Short the 2nd pin and 3rd pin of the SER. OUT. D-SUB 9pin socket.

Displaying PASS represents in normal condition.
Displaying FAIL represents in breakdown condition.

(2) If connected with a computer (protocol must be corresponding), the screen will display 0 ~ 9, which means RS-232 output is in normal condition.